Seminar Topic Summary Report

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Institution Name: Basaveshwar Engineering College, Bagalkot

Department of Computer Applications (M.C.A)

   Course: MCA

Semester: II

Seminar Topic : Edge Computing

Submitted by: Shridhar Biradar

USN: 2BA24MC039

Student Name: Shridhar Biradar

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   Guide/Faculty Name: Prof. C.M.jangin

Guide Signature:

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1. Introduction

Edge computing is a modern technology approach that processes data closer to its source—such as IoT devices or local servers—rather than relying entirely on distant cloud data centers. This reduces the time it takes to send data back and forth, improving speed and performance. By analyzing data locally, edge computing minimizes latency, lowers bandwidth usage, and enhances real-time decision-making.

It is especially useful in applications that require quick responses, such as autonomous vehicles, smart cities, healthcare monitoring, and industrial automation. Edge computing also improves data security, as sensitive information can be processed on-site without sending it to the cloud.

With the rise of connected devices and the need for faster processing, edge computing plays a crucial role in enabling efficient, reliable, and scalable digital services across various industries. It bridges the gap between data generation and intelligent action.

2. Seminar Topic Details

Title of the Topic:
 Edge ComputingArea/Domain:
 Distributed Computing / Internet of Things (IoT)Keywords: Edge Computing, IoT, Latency Reduction, Real-time Processing, Distributed Architecture

3. Topic Summary

Edge Computing is a distributed computing paradigm that brings computation and data storage closer to the data source, typically at the "edge" of the network. Instead of sending data to centralized cloud servers for processing, edge computing enables devices like sensors, routers, and local servers to handle data processing tasks.

This model is particularly important for applications that require real-time data processing, such as autonomous vehicles, smart manufacturing, remote healthcare monitoring, and smart cities. By processing data locally, edge computing reduces latency, enhances speed, and improves bandwidth usage, all of which are critical for time-sensitive and high-volume data tasks.

Edge computing is often integrated with technologies like Artificial Intelligence (AI) and Internet of Things (IoT), allowing smart devices to make decisions without cloud dependency. For instance, a smart camera can detect unusual activity and alert authorities instantly, without needing to send video data to the cloud first.

While edge computing offers significant advantages like real-time analytics, reduced data transfer costs, and enhanced privacy, it also presents challenges such as managing distributed nodes, ensuring data security, and updating remote edge devices.

4. Relevance to MCA Curriculum

Edge Computing aligns with multiple MCA subjects, including:

- Cloud Computing – extends the cloud model by adding processing at the network edge.

- Distributed Systems – covers decentralized data handling and system coordination.

- IoT and Smart Systems – applies edge logic to smart devices for real-time decision-making.

- Artificial Intelligence – supports on-device inference and intelligent systems.

- Computer Networks – focuses on edge-based routing, latency management, and data flow optimization.

5. Learning Objectives

- Understand the core concept and architecture of edge computing.

- Explore the advantages and challenges of edge computing over

traditional cloud models.

- Examine real-world applications in IoT, healthcare, and autonomous systems.

- Analyze how edge computing integrates with AI and cloud technologies.

- Identify the future trends and career opportunities in this domain.

6. Expected Outcome

After attending the seminar, students will:

- Gain a solid understanding of how edge computing works.

- Learn to differentiate between cloud, edge, and fog computing.

- Recognize key use cases where edge computing provides significant value.

- Understand practical applications in industrial, healthcare, and smart systems.

- Be prepared to explore advanced topics or projects in distributed and real-time computing.

7. References

[1] Shi, W., Cao, J., Zhang, Q., Li, Y., & Xu, L., Edge Computing: Vision and Challenges
, IEEE Internet of Things Journal, 2016The Emergence of Edge Computing
, Computer, IEEE, 2017What Is Edge Computing?, Cisco White Paper, 2022

8. Signatures

Coordinator Signature HOD Signature